

Advanced Concepts for Life Beyond Earth

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Uncovering fundamental principles of the origin and evolution of life in the universe can inspire new systems and architectures for science, exploration and settlement off-planet. Creativity in development of these advances flourishes in interdisciplinary environments, like that demonstrated by the field of Astrobiology.

In this presentation we will outline studies funded by the NASA Institute for Advanced Concepts (NIAC) that pose elegant and frequently biologically-inspired solutions to challenges in science, exploration and off-world settlement. NIAC has funded studies looking at new space suit concepts, ways to monitor and adjust spaceship life support systems, and ways to ensure the health and well-being of astronauts and the food they may be growing. NIAC Fellows have applied astrobiological principles in the development of systems that can help planetary surfaces to support life, and asked astrobiological questions while studying the efficacy of off-world caves in protecting human life. One NIAC Fellow even asks the question of what aspects of an extremophile's genome might be borrowed to convey enhanced adaptability to hostile environments.

We will also describe the NIAC, an institute of the Universities Space Research Association, and its successful process for the development and adoption of revolutionary systems and architectures. NIAC works to advance NASA's ability to answer its pressing questions and surmount its grand challenges. NIAC solicits proposals for scientifically credible, long-range concepts having a timeframe for implementation ten to forty years in the future. The institute provides a highly visible, recognizable, and high-level entry point for non-traditional thinkers and researchers.